

Claims

- [c1] 1. A water hammer arrester for arresting the water hammer effect between a liquid tank and a liquid supply point connected via a pipeline, the water hammer arrester comprising:
 - a pressure sensor set between the liquid tank and the liquid supply point for sensing the pressure within the pipeline;
 - a proportional-integral-differential (PID) control module connected to the pressure sensor for detecting signals submitted by the pressure sensor; and
 - a control valve connected to the PID control module and set in the pipeline, wherein the PID control module controls the operation of the control valve.
- [c2] 2. The water hammer arrester of claim 1, wherein the pressure sensor furthermore comprises a pressure level indicator set in the pipeline.
- [c3] 3. The water hammer arrester of claim 1, wherein the control valve is set in a pressured section relative to the pressure level indicator.
- [c4] 4. A liquid supply apparatus for delivering liquid to a liq-

uid supply point, the liquid supply apparatus comprising:
a liquid tank;
a pipeline connecting the liquid tank and the liquid sup-
ply point;
a pump set between the liquid tank and the liquid supply
point for pumping liquid from the liquid tank to the liq-
uid supply point;
a check valve set along the pipeline somewhere between
the pump and the liquid supply point for stopping the
back flow of liquid after shutting down the pump; and
at least a water hammer arrester set between the check
valve and the liquid supply point, the water hammer ar-
rester having:
a pressure sensor for sensing the pressure within the
pipeline;
a proportional-integral-differential (PID) control module
connected to the pressure sensor for detecting signals
submitted by the pressure sensor; and
a control valve connected to the PID control module and
set in the pipeline, wherein the PID control module con-
trols the operation of the control valve.

- [c5] 5. The liquid supply apparatus of claim 4, wherein the liquid tank is set underneath the liquid supply point.
- [c6] 6. The liquid supply apparatus of claim 4, wherein the pressure sensor furthermore comprises a pressure level

indicator set in the pipeline.

- [c7] 7. The liquid supply apparatus of claim 4, wherein the control valve is set in a pressured section relative to the pressure level indicator.
- [c8] 8. The liquid supply apparatus of claim 4, wherein the water hammer arrester is selected from a group consisting of an L-shaped water hammer arrester, an I-shaped water hammer arrester, a T-shaped water hammer arrester and other angle-valve water hammer arrester.
- [c9] 9. The liquid supply apparatus of claim 4, wherein the check valve comprises a full-open type of check valve.
- [c10] 10. A method of preventing water hammer effect through a water hammer arrester according to claim 1, comprising the step of:
installing a water hammer arrester along a pipeline so that excess pressure within the pipeline is automatically relieved according to the change in pressure within the pipeline, wherein the water hammer arrester comprises a pressure sensor, a proportional-integral-differential control module and a control valve.
- [c11] 11. The method of claim 10, wherein the process of relieving excess pressure according to the pressure change within the pipeline comprises:

the pressure sensor generates a signal when the pressure within the pipeline experiences a specific type of variation; and

the proportional–integral–differential control module controls the control valve to perform a linear shut down operation upon receiving a signal from the pressure sensor.

- [c12] 12. The method of claim 11, wherein the specific type of pressure variation within the pipeline includes a continuous drop in pressure to a minimum value within the pipeline.